



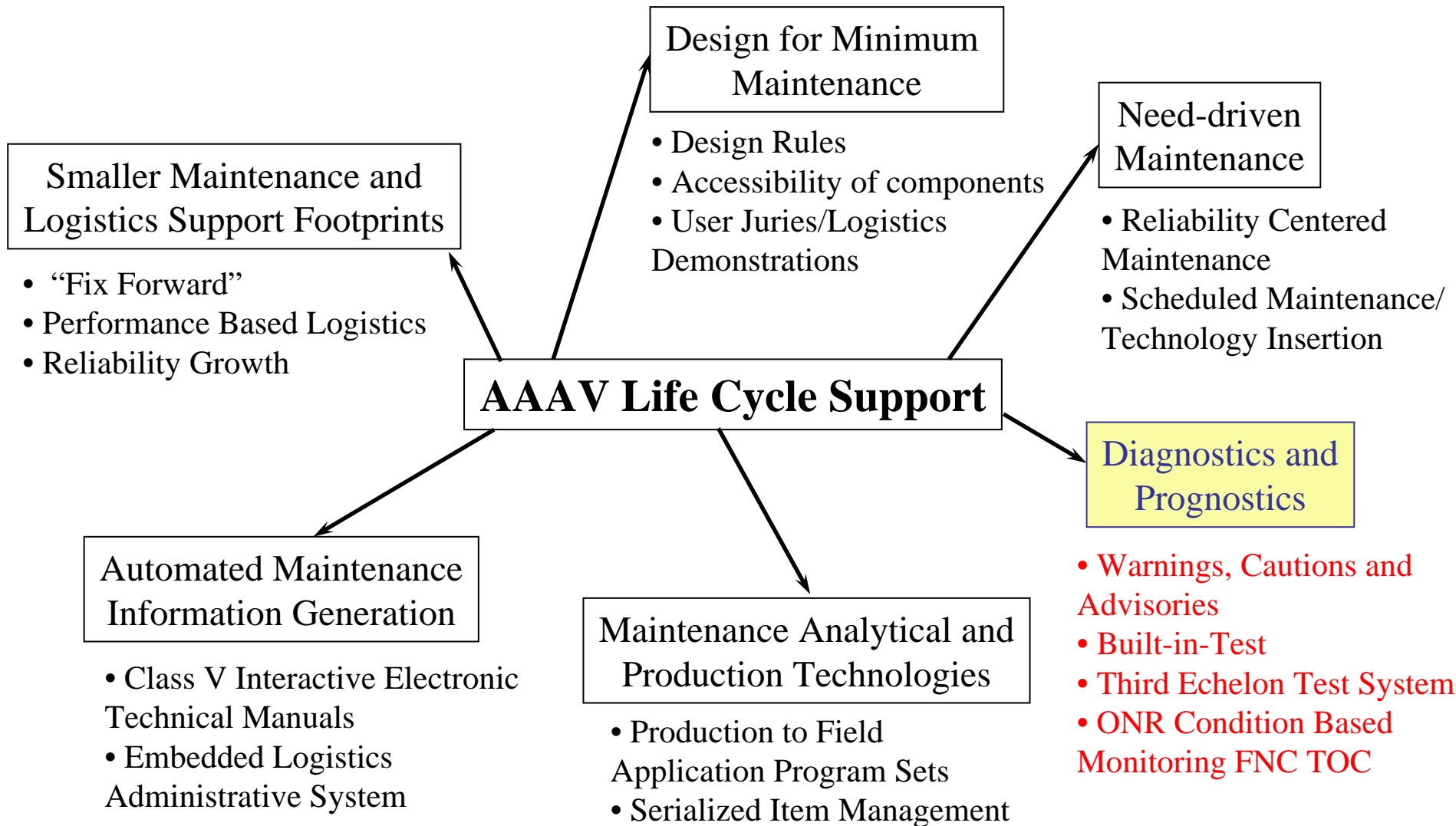
Advanced Amphibious Assault Vehicle Prognostics/Diagnostics Overview



Jan 2006



Execution of DoD CBM+ Policy





AAAV Prognostics System Definition & Focus



Prognostics - The ability to reliably predict the remaining useful life of mechanical components, within an actionable time period, with acceptable confidence limits

Focus:

- Safety during Over the Horizon Operations
- Combat Effectiveness
- Total Ownership Cost



Prognostics Program Objective: Enhanced Asset Visibility



SAFETY

ASSET VISIBILITY

AFFORDABILITY

Prioritization of
Maintenance Needs

Reduced PMCS and
Overhauls

Reduced Manhours

Reduced Spare Parts
Inventory

Avoid Collateral Damage

Identify True Component
Failure Rates and Causes

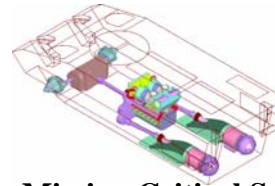
DESIGN FEEDBACK



Feedback Mechanism for
Design Activities



Ship to Objective Maneuver



Mission Critical Subsystems



Support Operational
Decision Making

Operator Warning of Impending Failure
with Decision Aids for Action

Just in Time Logistics Support

Integrated with Diagnostics/Fault Manager,
Embedded Logistics Administrative System,
and IETM



Prognostic Sensor Data

Drivetrain
SEPs

Drivetrain
SCME

HEU/CCS

Transmission
Subsystem

Transmission
Controller
Fault
Messages

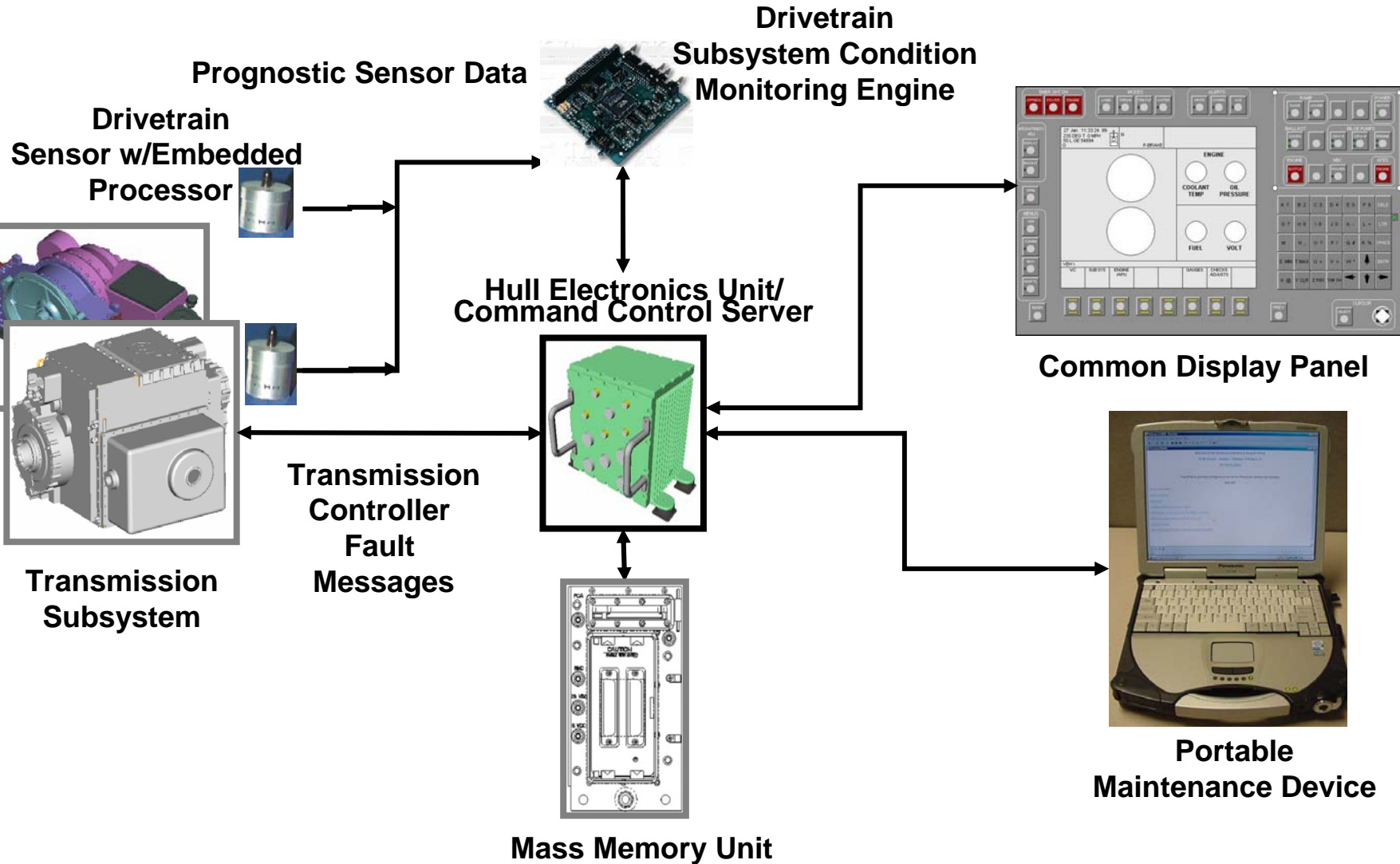
MMU

Common
Display
Panel

PMD



Prognostics Functional Architecture



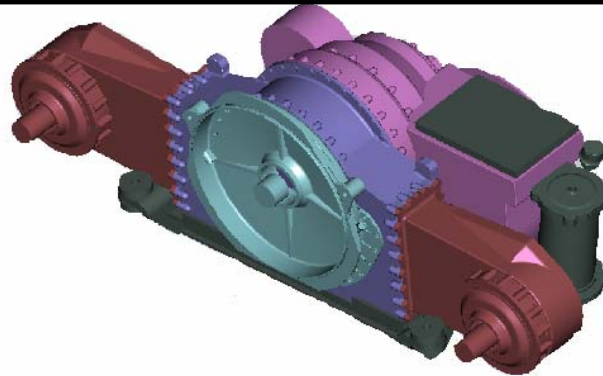


EFV Prognostics Objective Capability: Mobility Mission Critical Functionality



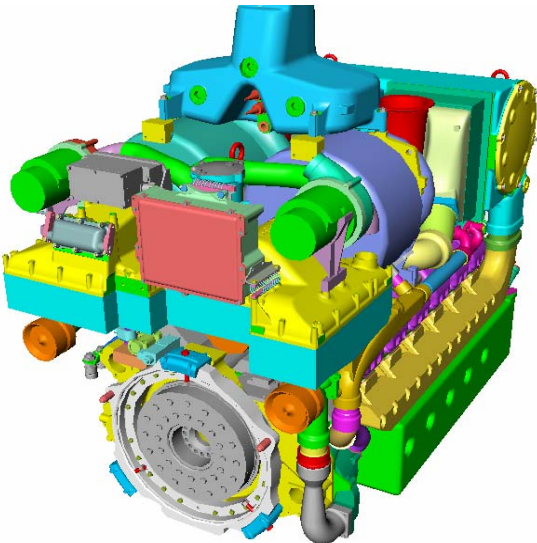
Power Transfer Module

Gear Mesh/Bearing Vibration/Clutch Wear



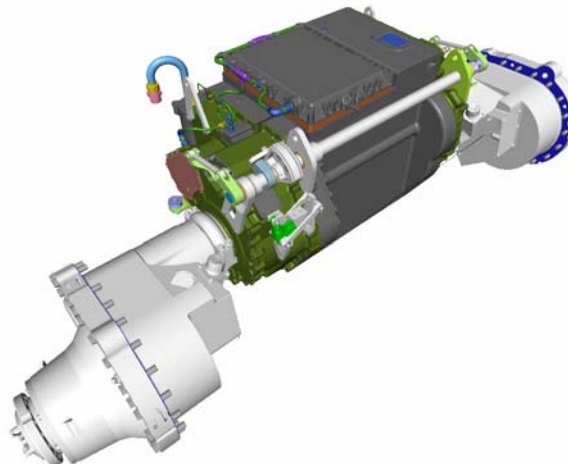
Engine

Trending Algorithms



Transmission and Final Drives

Gear Mesh/Bearing Vibration



Batteries

- State of Health
- State of Charge





Status



- 30 June 2005 - DRPM briefed ONR, presented Courses of Action and CBM Program recommendation to postpone CBM development.
- Recommendation based on funding constraints, evolving EFV design and focus on threshold requirements
- Prognostics/Condition Based Maintenance capabilities will be revisited in FY07-FY08



EFV Diagnostics



SYSTEM/SUBSYSTEM SPECIFICATION REQUIREMENTS

Fault Detection

Mission critical functions shall be monitored by Built-In-Test (BIT) . BIT shall display the fault status at the appropriate crew station. BIT, or using unit external test equipment, shall detect 75 percent of all operational mission failures not readily evident to the crew.

Fault Isolation

Fault isolation shall be performed when the maintainer selects the fault to be isolated. The EFV shall provide unambiguous fault isolation for 75 percent of LRU faults considered operational mission failures. Fault isolation testing includes visual inspection, interactive subsystem troubleshooting and embedded diagnostic routines.

False Alarms

False alarms are faults, where, upon investigation, it is found the fault cannot be confirmed. The Mean Time Between False Alarm (MTBFA) for all fault indications displayed to the vehicle operator shall be 12.5 hours or greater.

LRU Testing

The capability shall be provided to verify faults or failures at the Intermediate Level of Maintenance for 95 percent of all electrical and electronic LRU's.

Shop Replaceable Unit (SRU) Testing

95 percent of SRUs associated with mission critical function failures shall be isolated at the Intermediate Level of Maintenance. SRUs are defined by the Level of Repair Analysis



EFV Diagnostics



EFV Integrated Diagnostics/Manual Troubleshooting Procedure Process

